US EPA RECORDS CENTER REGION 5
498577

WELL NO. 3, open to the Cambrian-Ordovician aquifer, was completed in July 1971 to a depth of 1393 ft by the Wehling Well Works, Beecher. The well is located east of Highway 47 on the north side of the village, approximately 1295 ft N and 380 ft E of the SW corner of Section 32, T40N, R7E. The land surface elevation at the well is approximately 900 ft.

A 15.2-in. diameter hole was drilled to a depth of 352 ft and finished 12 in. in diameter from 352 to 1393 ft. The well is cased with 16-in. drive pipe from land surface to a depth of 208 ft and 12-in. pipe from land surface to a depth of 352 ft (cemented in).

A production test was conducted by the driller on July 28-29, 1971. After 23.8 hr of pumping at varying rates of 290 to 550 gpm, the final drawdown was 133 ft from a non-pumping water level of 362 ft below the top of the casing. Five hr after pumping was stopped, the water level had recovered to 376 ft.

The pumping equipment presently installed consists of a 40-hp Byron Jackson electric motor, a 7-in., 23-stage Byron Jackson submersible pump set at 510 ft, rated at 200 gpm at about 550 ft TDH, and has 510 ft of 4-in. column pipe. The well is equipped with 510 ft of airline.

A partial analysis of a sample (Lab. No. 186387) collected during the initial production test, showed the water to have a hardness of 246 mg/l, total dissolved minerals of 311 mg/l, and an iron content of 1.7 mg/l. The iron content is probably not representative of the water in this well because of initial pumping conditions.

A drillers log of Well No. 3 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Gravel and sand	30	30
Mud	160	190
Gravel, broken rock	10	200
Lime	6	206
Lime and shale	119	325
Shale	15	340
Lime	350	690
Sand	56	746
Sand, shale and red rock	14	760
Sand	14	774
Sand and shale	56	830
Sand	145	975
Red rock and sand	6	981
Sand	14	995
Red rock and green shale	10	1005
Sand	59	1064
Lime	111	1175
Sandy shale	10	1185
Lime	20	1205
Lime and green shale	9	1214
Sand	179	1393

ELGIN

The city of Elgin (55,691) installed a public water supply in 1887. Thirteen wells (Slade Ave. Well Nos. 1-6, Lavoie Ave. well, St. Charles St. Well No. 3, and Well Nos, 1A, 2A, 3A, 4A, and 5A) are in use and three other wells (Slade Ave. Shallow well, North State St. well, and Crighton Ave. well) are available for emergency use. This supply is also cross connected with the Elgin Mental Health Center (State Hospital) wells. In 1949 there were 9900 services; the average daily pumpage was 2,967,000 gpd. In 1974 there were 15,202 services, all metered; the average and maximum daily pumpages were 7,187,914 and 10,700,000 gpd, respectively. Water at the Slade Ave. and West Side plants is aerated, lime-soda softened, prechlorinated, fluoridated, and post chlorinated. Water at the St. Charles St. plant is aerated, zeolite softened, fluoridated, and chlorinated.

Initially, water was obtained from the Fox River with the pumping station and filtration plant located between the east bank of the Fox River and the Chicago and Northwestern RR, about 1000 ft north of Slade Ave. Because of adverse public opinion in obtaining water from this source, a groundwater supply consisting of the first four Slade Ave. wells was initiated in 1904. The supply from these wells and other wells subsequently drilled was not always adequate for the city demands, so the filtered river water supply was maintained to supplement the well supply until about 1920.

A description of the wells serving the Slade Ave. Treatment Plant follows:

SLADE AVE. WELL NO. 1, open to the Cambrian-Ordovician and the Elmhurst-Mt. Simon aquifers, was completed in 1901 to a depth of 2000 ft (rehabilitated in 1960 to a depth of 1945 ft) by Frank M. Gray, Milwaukee, Wis. The well is located at the southwest corner of the pumping station, approximately 775 ft S and 725 ft W of the NE corner of Section 11, T41N, R8E. The land surface elevation at the well is approximately 725 ft.

A drillers log of Slade Ave. Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Drift	38	38
Limestone	27	65
Shale	50	115
Limestone, dark	70	185
Limestone, light	140	325
Limestone, brown	75	400
Limestone, mixed with shale	85	485
Limestone	75	560
St. Peter Sandstone, dark	80	640
St. Peter Sandstone, white	62	702
Limestone, lower magnesium	48	750
Limestone, lower some hard	100	850
Limestone hard, some shale	30	880

Strata (continued)	Thickness (ft)	Depth (ft)
Sandstone, light pink	70	950
Pink limestone hard	100	1050
Sandstone	250	1300
Hard limestone	50	1350
Sandstone, dark	80	1430
Sandy limestone	150	1580
Sandstone	65	1645
"Potsdam" sandstone	155	1800
"Potsdam" reddish	80	1880
"Potsdam" mixed limestone	120	2000

Originally, a 12-in. diameter hole was reported to be drilled to a depth of 122 ft, reduced to 10 in. between 122 and 800 ft, and finished 8 in. in diameter from 800 to 2000 ft. In 1943, a sounding revealed an 11.5-in. hole to 404 ft, an unknown length of 10-in. liner at a depth of 800 ft, and an 8-in. diameter hole to the bottom. After rehabilitation in 1960 by S. B. Geiger & Co., Chicago, the hole was reported to be 20 in. in diameter to a depth of 125 ft, 16 in. in diameter from 125 to 800 ft, and 6 in. in diameter from 800 to 1945 ft. The well was then recased with 20-in. pipe from land surface to a depth of 125 ft and 16-in. pipe from land surface to a depth of 160 ft (cemented in).

In March 1917, a 25-lb weight was lowered in this well to a depth of 1159 ft, indicating bridging or filling of the well since construction.

In 1931, after a few years of infrequent use, the Varner Well and Pump Co., Dubuque, Iowa, cleaned out the well to a depth of 1850 ft and shot at depths of 1525, 1450, 1200, and 1100 ft. An airlift was installed and weir box measurements showed a production of 360 gpm with a drawdown of 36 ft from a nonpumping water level of 87 ft below land surface.

In 1933, the well reportedly produced 847 gpm for 48 hr with a drawdown of 73 ft from a nonpumping water level of 94 ft below the top of the well.

In 1943, S. B. Geiger & Co., Chicago, reportedly shot this well with a 500-lb charge of 100 percent blasting gelatin between the depths of 1120 and 1160 ft. Approximately 30 cubic yards of sand were removed from the well.

A production test was conducted by the State Water Survey on March 21-22, 1946. After 20.5 hr of pumping at rates ranging from 520 to 685 gpm, the final drawdown was 93 ft from a nonpumping water level of 147 ft below the pump base. Thirty-four min after pumping was stopped, the water level had recovered to 170 ft. During this test, Slade Ave. Well Nos. 2 and 3 were pumping intermittently.

In April 1946, the well was cleaned out by the Layne-Western Co., Aurora, to a depth of 1945 ft. Bridges were encountered at depths of 1145 and 1560 ft and were removed.

On April 23, 1947, after 5 hr of pumping at a rate of 1124 gpm, the pumping water level was below the 302-ft airline. On April 24 and May 2, 1947, the nonpumping water level was reported to be 157 ft below the pump base.

On June 27, 1948, the well reportedly produced 1076 gpm for 18 hr with a drawdown of 147 ft from a nonpumping water level of 160 ft below the pump base.

In 1956, this well was cleaned out to a depth of 1935 ft. A bridge was found at a depth of 1145 ft.

From June 3, 1956 to April 21, 1957, nonpumping water levels ranged from 240 to 295 ft.

The pumping equipment presently installed consists of a 200-hp KSB electric motor, a Layne & Bowler submersible pump set at 600 ft, rated at about 1000 gpm, and has 600 ft of 6-in. column pipe.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C008783) of a sample collected June 14, 1974, after pumping for 16 hr at 984 gpm, showed the water to have a hardness of 241 mg/l, total dissolved minerals of 330 mg/l, a barium content of 6.8 mg/l, and an iron content of 0.0 mg/l.

SLADE AVE. WELL NO. 2, open to the Cambrian-Ordovician and the Elmhurst-Mt. Simon aquifers, was constructed in 1904 to a depth of 1300 ft by Frank M. Gray, Milwaukee, Wis., deepened in 1924 to a depth of 1950 ft by Coney and Coon, Elgin, and cleaned and deepened in January 1946 to a depth of 1965 ft (rehabilitated in 1959 to a depth of 1935 ft) by the Layne-Western Co., Aurora. The well is located on the west side of the treatment plant about 205.4 ft northeast of Slade Ave. Well No. 1, approximately 640 ft S and 575 ft W of the NE corner of Section 11, T41N, R8E. The land surface elevation at the well is approximately 720 ft.

In March 1917, a 25-lb weight was lowered in this well to a depth of 1272 ft indicating bridging or filling of the well since construction. After the production had decreased, the well was cleaned out in 1924 and the well deepened to 1950 ft.

After deepening in 1924, the hole was reported to be 12 in. in diameter to a depth of 122 ft, 10 in. between 122 and 800 ft, and finished 8 in. in diameter from 800 to 1950 ft. In 1946, when the well was cleaned and deepened to a depth of 1965 ft, the following was reported: 12-in. diameter hole to a depth of 695.3 ft, reduced to 10 in. between 695.3 and 861.7 ft, and finished 8 in. in diameter from 861.7 to 1965 ft. A 6-in. slotted liner was placed from 1117 ft to a depth of 1264 ft. At this time a leak was reported in an upper 12-in. casing at a depth of 128 ft. After rehabilitation in 1959 by S. B. Geiger & Co., Chicago, the hole was reported to be 20 in. in diameter to a depth of 125 ft, 16 in. in diameter from 125 to 800 ft, and 6 in. in diameter from 800 to 1935 ft. The well was then recased with 20-in. pipe from land surface to a depth of 125 ft and 16-in. pipe from land surface to a depth of 160 ft (cemented in).

In 1933, the well reportedly produced 446 gpm for 48 hr with a drawdown of 58 ft from a nonpumping water level of 86 ft below the top of the well.

In 1941, S. B. Geiger & Co., Chicago, reportedly shot

this well at depths of 1375 and 1800 ft.

This well was rehabilitated by the Layne-Western Co., Aurora, from January to March 1946. It was found filled below 1221 ft with a hard blue sandy shale which was drilled and bailed out and the hole cleaned to a depth of 1965 ft. Following this rehabilitation work, a production test was conducted on March 12-13, 1946, by representatives of the city and the State Water Survey. After pumping for 22.9 hr at rates ranging from 550 to 465 gpm, the final drawdown was 113 ft from a nonpumping water level of 133 ft below the pump base. Ten min after pumping was stopped, the water level had recovered to 168 ft. During this test, Slade Ave. Well Nos. 1 and 3 were pumping intermittently.

On June 19, 1960, the well reportedly produced 790 gpm with a drawdown of 60 ft from a nonpumping water level of 328 ft below the pump base.

On July 4, 1971, the nonpumping water level was reported to be 440 ft.

The pumping equipment presently installed consists of a 200-hp Byron Jackson electric motor, a 12-in., 9-stage Byron Jackson submersible pump set at 600 ft, rated at 1000 gpm at about 550 ft TDH, and has 600 ft of 10-in. column pipe.

The following mineral analysis (Lab. No. 186198) is for a water sample from the well collected July 13, 1971, after 24 hr of pumping. Methane gas was reported in a previous sample.

SLADE AVE. WELL NO. 2, LABORATORY NO. 186198

		mg/l	*me/l*			*mg/l*	*me/l*
Iron (total)	Fe	0.1		Silica	SiO_2	6.8	
Manganese	Mn	0.04		Fluoride	F	0.7	
Ammonium	NH_4	0.5	0.03	Boron	B	0.2	
Sodium	Na	28.4	1.24	Nitrate	NO_3	0.0	0.00
Potassium	K	9.1	0.23	Chloride	Cl	15	0.42
Calcium	Ca	63.2	3.15	Sulfate	SO_4	14.0	0.29
Magnesium	Mg	25.4	2.09	Alkalinity (as $CaCO_3$)		300	6.00
Strontium	Sr	2.83	0.06	Hardness (as $CaCO_3$)		262	5.24
Barium	Ba	3.1					
Copper	Cu	0.21	0.01	Total dissolved minerals		368	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	<0.05		Turbidity		3	
Lithium	Li	0.01		Color		0	
Nickel	Ni	<0.05		Odor		0	
Zinc	Zn	0.20	0.01	Temp. (reported)		56.5F	

SLADE AVE. WELL NO. 3, open to the Cambrian-Ordovician and the Elmhurst-Mt. Simon aquifers, was constructed in 1904 to a depth of 1300 ft by Frank M. Gray, Milwaukee, Wis., and deepened in 1924 to a depth of 1960 ft (rehabilitated in 1960 to a depth of 1793 ft) by Coney and Coon, Elgin. The well is located about 300 ft north of the treatment plant about 333.6 ft northeast of Slade Ave. Well No. 1, approximately 600 ft S and 440 ft W of the NE corner of Section 11, T41N, R8E. The land surface elevation at the well is approximately 720 ft.

In March 1917, a 25-lb weight was lowered in this well to a depth of 1178 ft indicating bridging or filling of the well since construction. After the production had decreased, the well was cleaned out in 1924 and the well deepened to 1960 ft.

After deepening in 1924, the hole was reported to be 12 in. in diameter to a depth of 122 ft, 10 in. between 122 and 800 ft, and finished 8 in. in diameter from 800 to 1960 ft. The well was reported to be cased with 12-in. pipe to at least 115 ft. After rehabilitation in 1961 by S. B. Geiger & Co., Chicago, the hole was reported to be 20 in. in diameter to a depth of 145 ft, 15.2 in. in diameter from 145 to 800 ft, and 8 in. in diameter from 800 to 1793 ft. The well was then recased with 20-in. pipe from land surface to a depth of 145 ft and 16-in. pipe from land surface to a depth of 160 ft (cemented in).

In 1934, the well reportedly produced 893 gpm for 1 hr with a drawdown of 65 ft from a nonpumping water level of 93 ft below land surface.

In May 1947, after a new pump was installed, a 24-hr production test was conducted while pumping at a rate of 1146 gpm. Considerable sand was discharged which cleared up during the test. Subsequent operations showed periodical discharges of sand which could only be cleared up by continuous periods of operation. On May 12, 1947, the nonpumping water level was reported to be 155 ft below the pump base after a 12-hr idle period.

On June 27, 1948, the well reportedly produced 1053 gpm for 18 hr with a drawdown of 75 ft from a nonpumping water level of 170 ft below the pump base.

From May 6, 1956 to April 21, 1957, nonpumping water levels ranged from 260 to 305 ft.

On June 19, 1960, the nonpumping water level was reported to be 320 ft below the pump base.

After this well was rehabilitated in 1960-1961, a production test using three observation wells was conducted by S. B. Geiger & Co. on February 28-March 1, 1961. After 20.5 hr of pumping at a rate of 1375 gpm, the drawdown was 79 ft from a nonpumping water level of 352 ft.

The pumping equipment presently installed is a Byron Jackson submersible pump set at 600 ft, rated at 900 gpm, and powered by a 150-hp Byron Jackson electric motor.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B19910) of a sample collected November 15, 1976, after pumping for 2 hr at 909 gpm, showed the water to have a hardness of 263 mg/l, total dissolved minerals of 304 mg/l, a barium content of 4.4 mg/l, and an iron content of 0.1 mg/l.

SLADE AVE. WELL NO. 4, open to the Cambrian-Ordovician and the Elmhurst-Mt. Simon aquifers, was constructed in 1904 to a depth of 1300 ft by Frank M. Gray, Milwaukee, Wis., and deepened in 1924 to a depth of 1880 ft (rehabilitated in 1954 to a depth of 1898 ft) by Coney and Coon, Elgin. The

well is located about 600 ft north of the treatment plant about 501.4 ft northeast of Slade Ave. Well No. 1, approximately 525 ft S and 290 ft W of the NE corner of Section 11, T41N, R8E. The land surface elevation at the well is approximately 720 ft.

In March 1917, a 25-lb weight was lowered in this well to a depth of 589 ft indicating bridging or filling of the well since construction. After production decreased, the well was cleaned out in 1924 and was deepened to 1880 ft.

After deepening in 1924, the hole was reported to be 12 in. in diameter to a depth of 122 ft, 10 in. between 122 and 800 ft, and finished 8 in. in diameter from 800 to 1880 ft. In May 1942 the hole diameter was checked and reported to be 12 in. in diameter to a depth of 591 ft, reduced to 10 in. between 591 and 860 ft, and finished 8 in. in diameter from 860 to 1880 ft. A 12-in. diameter casing was reported to be from land surface to a depth of 300 ft. After rehabilitation in October 1954, the hole was reported to be 20 in. in diameter from 275 W 501 ft, 15 in. in diameter from 501 to 792 ft, and 8 in. in diameter from 792 to 1898 ft. The well is cased with 30-in. drive pipe from land surface to a depth of 46 ft, 25-in. pipe from land surface to a depth of 146 ft (cemented in), and 20-in. pipe from land surface to a depth of 275 ft (cemented in). In October 1972, the Layne-Western Co., Aurora, installed a 15-in. liner from 622 ft to a depth of 823 ft.

In 1934, the well reportedly produced 857 gpm for 6 hr with a drawdown of 51 ft from a nonpumping water level of 104 ft below land surface.

In May 1942, S. B. Geiger & Co., Chicago, checked this well for hole sizes and depth. A bridge was found in the well at a depth of 590 ft which was removed.

In May 1947, a 24-hr production test was conducted after a new pump was installed. After pumping at a rate of 1146 gpm, the drawdown was 92 ft from a nonpumping water level of 156 ft below the pump base. A difficulty of pumping sand with a lowered turbine setting was experienced and the water would clear up only after long periods of continuous pumping.

This well was rehabilitated in October 1954 by L. Cliff Neely, Batavia. The well reportedly produced 1077 gpm with a drawdown of 87 ft from a nonpumping water level of 250 ft below land surface.

On January 24, 1957, the well reportedly produced 1000 gpm for 18 hr with a drawdown of 60 ft from a nonpumping water level of 265 ft.

From May 6, 1956 to April 21, 1957, nonpumping water levels ranged from 250 to 310 ft.

In May 1959, the well reportedly produced 915 gpm for 3.5 hr with a drawdown of 110 ft from a nonpumping water level of 280 ft.

On June 19, 1960, after pumping at a rate of 1038 gpm, the drawdown was 52 ft from a nonpumping water level of 318 ft below the pump base.

The pumping equipment presently installed consists of a 200-hp Byron Jackson electric motor, a 12-in., 10-stage Byron Jackson submersible pump set at 600 ft, rated at 1000 gpm at about 600 ft TDH, and has 600 ft of 8-in. column pipe.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B20295) of a sample collected November 15, 1976, after pumping for 4 hr at 1230 gpm, showed the water to have a hardness of 256 mg/l, total dissolved minerals of 317 mg/l, a barium content of 3.1 mg/l, and an iron content of 0.0 mg/l.

SLADE AVE. SHALLOW WELL, finished in sand and gravel, was dug in 1914 to a depth of 19 ft, and deepened in 1934 as a drilled well to a depth of 53.5 ft (reported to be 52.9 ft deep in 1970). This well is available for emergency use. The well is located about 110 ft southwest of the pumping station, approximately 850 ft S and 700 ft W of the NE corner of Section 11, T41N, R8E. The land surface elevation at the well is approximately 725 ft.

The diameter of the dug portion of the well is not recorded and it was lined with concrete. The drilled part was cased with 12-in. pipe followed by a 12-in. diameter screen. In May 1970, after rehabilitation, the well was cased with 10-in. pipe from land surface to a depth of 42.9 ft followed by 10 ft of 10-in. No. 5 (0.105 in.) Layne stainless steel shutter screen.

In 1916, the nonpumping water level was reported to be 28 ft and the well produced about 600,000 gpd. When the nearby 6-in. wells were placed in use in 1921, the water level was drawn to the bottom of the dug portion of the well.

On September 28, 1946, the well reportedly produced 200 gpm with a drawdown of 10 to 12 ft from a nonpumping water level of 12 ft below the pump base after an idle period of a month.

This well was rehabilitated in 1970 by the Layne-Western Co., Aurora, and the depth was reported to be 52.9 ft. A new casing, screen, and pump were installed. On May 26, 1970, after the well was acidized with 500 gal of HCl, the Layne-Western Co. reported that the well produced 289 gpm with a drawdown of 25.3 ft from a nonpumping water level of 9.7 ft.

The pumping equipment presently installed is an Aurora turbine pump set at 47 ft, rated at 200 gpm, and powered by a 7½-hp U.S. electric motor.

A mineral analysis of a sample (Lab. No. 115123) collected June 28, 1948, after pumping for 6 hr at 200 gpm, showed the water to have a hardness of 332 mg/l, total dissolved minerals of 386 mg/l, and an iron content of 0.5 mg/l.

Three 6-in. diameter wells, finished in sand and gravel, were drilled about 1921 to depths of about 37 ft, and spaced 22 ft apart, the nearest well being about 45 ft from the Slade Ave. Shallow Well. Their combined production was reported to be 500,000 gpd in December 1921. Only one of the pumps was operated continuously at a rate of 350 gpm in January 1925, because little additional water could be obtained by the operation of additional pumps. By August 1931, continuous

operation of a single well in the group produced 250,000 gpd. These wells were abandoned in 1932.

SLADE AVE. WELL NO. 5, open to the Cambrian-Ordovician aquifer, was completed in September 1949 to a depth of 1225 ft by the Layne-Western Co., Aurora. The well is located southwest of the pumping station about 600 ft southwest of Slade Ave. Well No. 1, approximately 1175 ft S and 1175 ft W of the NE corner of Section 11, T41N, R8E. The land surface elevation at the well is approximately 725 ft.

A drillers log of Slade Ave. Well No. 5 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Yellow clay	5	5
Sand and gravel	30	35
Limestone	25	60
Shale	50	110
Limestone	120	230
Limestone and shale	45	275
Limestone	305	580
Sandstone	170	750
Broken limestone	220	970
Sandstone and shale	65	1035
Sandstone	180	1215
Shale	10	1225

A 30-in. diameter hole was drilled to a depth of 129 ft and finished 20 in. in diameter from 129 to 1225 ft. The well is cased with 30-in. OD drive pipe from land surface to a depth of 65 ft and 22-in. OD pipe from land surface to a depth of 129 ft (cemented in).

A production test was conducted by the driller on September 22-23, 1949. After 20.4 hr of pumping at rates ranging from 1340 to 1001 gpm, the drawdown was 210 ft from a nonpumping water level of 100 ft below the pump base. Pumping was continued for 5.6 hr at rates ranging from 805 to 200 gpm with a final drawdown of 149 ft.

During the period of November 5-December 31, 1950, the nonpumping water levels ranged from 210 to 240 ft.

During the period of May 6, 1956 to April 21, 1957, the nonpumping water levels ranged from 250 to 310 ft.

On May 6, 1959, the well reportedly produced 1202 gpm for 3 hr with a drawdown of 88 ft from a nonpumping water level of 300 ft.

On June 19, 1960, the well reportedly produced 1202 gpm with a drawdown of 75 ft from a nonpumping water level of 307 ft below the pump base.

The pumping equipment presently installed is a 12-in., 9-stage Byron Jackson submersible pump set at 600 ft, rated at 1000 gpm, and powered by a 200-hp Byron Jackson electric motor.

A mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B20294) of a sample collected November 15, 1976, after pumping for 28 hr at 1018 gpm, showed the water to have a hardness of 266 mg/l, total dissolved minerals of 347 mg/l, a barium content of 5.4 mg/l, and an iron content of 0.0 mg/l.

SLADE AVE. WELL NO. 6, open to the Cambrian-Ordovician aquifer, was completed in March 1958 to a depth of 1300 ft by L. Cliff Neely, Batavia. The well is located about 650 ft southwest of Slade Ave. Well No. 5 and 1250 ft southwest of Slade Ave. Well No. 1, approximately 1750 ft S and 1500 ft W of the NE corner of Section 11, T41N, R8E. The land surface elevation at the well is approximately 725 ft.

A drillers log of Slade Ave. Well No. 6 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Gravel	30	30
Gravel and sand	20	50
Lime	13	63
Sandy shale	7	70
Shale	45	115
Lime	45	160
Shale	21	181
Lime	53	234
Shale	36	270
Lime	323	593
Sand	47	640
Lime	10	650
Sand	98	748
Gypsum white	2	750
Sand	19	769
Lime	11	780
White gypsum	5	785
Lime	32	817
Shale	3	820
Sandy lime	5	825
Lime	75	900
Gypsum	8	908
Lime	2	910
Dolomite	10	920
Lime	10	930
Red rock and shale	10	940
Lime	25	965
Red sandy shale	11	976
Red rock and lime shells	21	997
Shale	36	1033
Sandy lime	21	1054
Sand	121	1175
Lime	6	1181
Sand	34	1215
Black lime	5	1220
Shale	80	1300

A 26-in. diameter hole was drilled to a depth of 296 ft and finished 19 in. in diameter from 296 to 1300 ft. The well is cased with 26-in. drive pipe from land surface to a depth of 54 ft and 20-in. pipe from land surface to a depth of 293.5 ft (cemented in).

Upon completion, the well reportedly produced 1503 gpm with a drawdown of 37 ft from a nonpumping water level of 407 ft below the pump base.

The pumping equipment presently installed is a 14-in., 7-stage Byron Jackson submersible pump set at 600 ft, rated at 1500 gpm at about 500 ft TDH, and powered by a 250-hp Byron Jackson electric motor.

A partial analysis of a sample (Lab. No. 146283) collected April 1, 1958, showed the water to have a hardness of 252 mg/l, total dissolved minerals of 326 mg/l, and an iron content of 0.2 mg/l.

A description of the wells serving the St. Charles St.

Treatment Plant follows:

ST. CHARLES ST. WELL NO. 1, finished in sand and gravel, was completed in 1921 to a depth of 100 ft by the Kelly Well Co., Grand Island, Neb. This well was abandoned about 1933. The well was located in the southern part of the city on the west side of St. Charles St. between Dixon and Elgin Aves., approximately 700 ft N and 1500 ft W of the SE corner of Section 24, T41N, R8E. The land surface elevation at the well is approximately 718 ft.

A drillers log of St. Charles St. Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Clay, gravel, and boulders	13	13
Gravel and clay	17	30
Clay	10	40
Clay, few boulders, and fine sand	23	63
Fine sand	1	64
Clay and gravel	13	77
Coarse sand	11	88
Gravel and boulders	9	97
Boulders	4	101

The well was cased with 24-in. OD by 18-in. ID concrete pipe from within a pit that was 11 ft deep to a depth of 78 ft. A perforated concrete screen of the same size extended from 78 to 100 ft and a concrete plug extended to 101 ft.

Upon completion, the well reportedly produced 1080 gpm for 7 hr each day for 4 days with a maximum drawdown of 24 ft from a nonpumping water level at the top of the casing.

The production rate of the well gradually decreased to 860 gpm in 1925, 685 gpm in June 1928, and 133 gpm in August 1931. No recession in the nonpumping water level had occurred during the 10-year operation of the well and the diminished capacity was attributed to a blocking of the water passages in the concrete screen or the gravel surrounding it.

About October 1931, after the well was surged for 3 days and considerable sand was removed, a test was made showing an increase in production of 250 gpm. Surging was continued but after another day nothing but pea-sized gravel was removed and upon testing the production decreased to the presurging capacity of 100 gpm.

A mineral analysis of a sample (Lab. No. 53092) collected January 13, 1925, showed the water to have a hardness of 269 mg/l, total dissolved minerals of 377 mg/l, and an iron content of 1.2 mg/l.

An attempt to construct a sand and gravel well at the following Lavoie Ave. well site to a depth of 85 ft failed to produce a sufficient quantity of water.

LAVOIE AVE. WELL, open to the Cambrian-Ordovician and the Elmhurst-Mt. Simon aquifers, was constructed in September 1931 to a depth of 677.5 ft (electrically logged in 1943 to a depth of 654 ft) by the W. L. Thorne Co., Des Plaines, and deepened in 1945 to a depth of 1978 ft by S. B. Geiger & Co., Chicago. The well is located in the southeastern part of the city on the east side of Lavoie Ave. between Hammond and Elgin Aves., approximately 200 ft N and 270 ft W of the SE corner of Section 24, T41N, R8E. The land surface elevation at the well is approximately 710 ft.

A sample study log of the Lavoie Ave. Well furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SERIES		
"Clay"	4	4
"Sand"	26	30
Gravel, clean	55	85
ORDOVICIAN SYSTEM		
Maquoketa shale and dolomite	190	275
Galena-Platteville dolomites	335	610
Glenwood Formation		
"Sandstone, hard"	55	665
"Sandstone and shale"	12.5	677.5
St. Peter Sandstone		
Sandstone	122.5	800
Conglomerate of sandstone, shale, and chert	38	838
Oneota Dolomite, some shale and sandstone	40	878
CAMBRIAN SYSTEM		
Eminence-Potosi Dolomite	102	980
Franconia Formation, shale, some sandstone and dolomite	75	1055
Ironton-Galesville Sandstone		
Sandstone, some dolomite	85	1140
Sandstone, incoherent	65	1205
Sandstone and dolomite	20	1225
Eau Claire shale, sandstone, and dolomite	425	1650
Mt. Simon Sandstone	328	1978

When the well was deepened in 1945, a 30-in. diameter hole was drilled to a depth of 87.3 ft, reduced to 15 in. between 87.3 and 867 ft, reduced to 12 in. between 867 and 1070 ft, reduced to 10 in. between 1070 and 1414 ft, and finished 8 in. in diameter from 1414 to 1978 ft. The well is cased with 30-in. OD pipe from land surface to a depth of 8 ft, 24-in. pipe from land surface to a depth of 40 ft, 16-in. OD pipe from 6 ft above the floor of a well pit to a depth of 87.3 ft, 12-in. pipe from 805 ft to a depth of 867 ft, 10-in. pipe from 966 ft to a depth of 1070 ft, and 8-in. pipe from 1230 ft to a depth of 1414 ft. In 1948, the Layne-Western Co., Aurora, removed the 12-in. liner and replaced it with a slotted liner.

When the well was completed to a depth of 677.5 ft, a production test was conducted on September 24, 1931. After 18 hr of pumping at rates of 690 to 700 gpm, the drawdown was 181 ft from a nonpumping water level of 7 ft below land surface.

On November 22, 1943, the nonpumping water level was reported to be 20 ft below land surface.

On December 31, 1945, after deepening, the nonpumping water level was reported to be 75 ft below the pump base.

In August 1946, the well reportedly produced about 1000 gpm with a drawdown of 212 ft from a nonpumping water level of 73 ft below the pump base.

On March 1, 1947, after a 6-hr idle period, the nonpumping

water level was reported to be 60 ft.

In 1949, the Layne-Western Co., Aurora, rehabilitated and shot this well as follows: 300 qt nitro from 1135 to 1180 ft, 200 qt nitro from 1094 to 1130 ft, and 200 qt nitro from 745 to 790 ft. In a following test, the well reportedly produced 791 gpm for 30 hr with a drawdown of 192 ft from a nonpumping water level of 67 ft below land surface.

The pumping equipment presently installed consists of a 150-hp U. S. electric motor, an 11-in., 9-stage Byron Jackson turbine pump set at 550 ft, rated at 900 gpm at about 540 ft TDH, and has 550 ft of 8-in. column pipe. A 20-ft section of 8-in. suction pipe is attached to the pump intake. The well is equipped with 550 ft of airline.

A partial analysis of a sample (Lab. No. 149546) collected May 6, 1959, showed the water to have a hardness of 272 mg/l, total dissolved minerals of 439 mg/l, and an iron content of 0.1 mg/l.

ST. CHARLES ST. WELL NO. 2, finished in sand and gravel, was completed in October 1933 to a depth of 105 ft by the Kelly Well Co., Grand Island, Neb. This well is not in use. The well is located about 35 ft northeast of St. Charles St. Well No. 1, approximately 725 ft N and 1475 ft W of the SE corner of Section 24, T41N, R8E. The land surface elevation at the well is approximately 718 ft.

The well is cased with 16-in. ID concrete pipe and perforated concrete screen to a depth of 105 ft.

Upon completion, the nonpumping water level was reported to be 13 ft below land surface.

In 1944, weekly observations of the nonpumping water level indicated levels of 24 to 25 ft below the pump base.

Nonpumping water levels were reported to be 16 ft on November 16, 1946; 13.5 ft on January 30, 1947; and 15.6 ft on February 26, 1947.

The pumping equipment presently installed consists of a 40-hp U. S. electric motor, a 12-in., 4-stage American Well Works turbine pump (Head No. 58076, Bowl Assembly No. 57434) rated at 450 gpm at about 237 ft head, and has 70.4 ft of 8-in. column pipe. A 12-ft section of 8-in. suction pipe is attached to the pump intake. The well is equipped with 85 ft of airline.

A mineral analysis of a sample (Lab. No. 115158) collected June 30, 1948, showed the water to have a hardness of 552 mg/l, total dissolved minerals of 652 mg/l, and an iron content of 4.4 mg/l.

ST. CHARLES ST. WELL NO. 3, open to the Cambrian-Ordovician aquifer, was completed in November 1953 to a depth of 1255 ft by L. Cliff Neely, Batavia. The well is located just north of the treatment plant near the rear of the building about 50 ft west of St. Charles St. Well No. 2, approximately 725 ft N and 1525 ft W of the SE corner of Section 24, T41N, R8E. The land surface elevation at the well is approximately 718 ft.

A sample study log of St. Charles St. Well No. 3 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
No sample	110	110
ORDOVICIAN SYSTEM		
Maquoketa Group		
Dolomite, brownish gray	131	241
Shale, dolomitic, silty, grayish brown	34	275
Galena-Platteville Groups (poor samples)		
Dolomite, pale grayish brown, fine to medium, slightly pyritic	335	610
Ancell Group		
Glenwood-St. Peter Sandstone (poor samples)		
Sandstone, light gray, fine to medium, incoherent	218	828
Chert, yellow, pink, orange, white, chalky; and shale, greenish gray	42	870
CAMBRIAN SYSTEM		
Eminence-Potosi Dolomite		
Dolomite, sandy, pale pinkish buff, very fine; sandstone, fine to coarse, incoherent; little shale, green, red, partly slightly glauconitic, geode quartz	125	995
Franconia Formation		
Shale, dolomitic, silty, red, weak; sandstone, dolomitic, silty, greenish gray, fine, glauconitic	60	1055
Ironton-Galesville Sandstone		
Sandstone, gray, fine to very coarse, rounded, incoherent	170	1225
Eau Claire Formation		
Dolomite, silty, sandy, pale yellowish gray, pink, very fine; sandstone, light gray, fine to medium, incoherent; shale, silty, sandy, dolomitic, greenish gray, weak	30	1255

A 25-in. diameter hole was drilled to a depth of 315 ft, reduced to 20 in. between 315 and 1040 ft, and finished 15.2 in. in diameter from 1040 to 1255 ft. The well is cased with 26-in. drive pipe from land surface to a depth of about 130 ft and 20-in. OD pipe from land surface to a depth of 315 ft (pressure grouted with 375 bags of cement).

In November 1953, six charges of nitroglycerin were exploded as follows: 420 qt at 1225 ft, 100 qt at 858 ft, 120 qt at 807 ft, 100 qt at 747 ft, 100 qt at 646 ft, and 100 qt at 596 ft. By February 2, 1954, about 300 cubic yards of sandstone had been removed since the shooting in the previous November.

A production test was conducted on March 12, 1954, by representatives of the driller and the city. After 48 hr of pumping at a rate of 1438 gpm, the drawdown was 188 ft from a nonpumping water level of 192 ft.

On May 30, 1960, the well reportedly produced 1100 gpm with a drawdown of 100 ft from a nonpumping water level of 285 ft below the pump base.

On August 18, 1975, the Layne-Western Co., Aurora, reported that the well produced 600 gpm with a drawdown of 75 ft from a nonpumping water level of 400 ft.

The pumping equipment presently installed consists of a 150-hp U. S. electric motor, a 10-in., 17-stage Aurora turbine pump (No. 77565) set at 600 ft, rated at 1000 gpm at about 390 ft TDH, and has 600 ft of 8-in. column pipe. The well is equipped with 600 ft of airline.

The following mineral analysis (Lab. No. 186199) is for a water sample from the well collected July 13, 1971, after 24 hr of pumping.

ST. CHARLES ST. WELL NO.3, LABORATORY NO. 186199

		mg/l	me/l			mg/l	me/l
Iron (total)	Fe	0.2		Silica	SiO_2	8.4	
Manganese	Mn	0.11		Fluoride	F	0.7	
Ammonium	NH_4	0.5	0.03	Boron	B	0.2	
Sodium	Na	23.7	1.03	Nitrate	NO_3	0.0	0.00
Potassium	K	10.7	0.27	Chloride	Cl	4	0.11
Calcium	Ca	63.2	3.15	Sulfate	SO_4	7.0	0.15
Magnesium	Mg	24.9	2.05	Alkalinity (as $CaCO_3$)		308	6.16
Strontium	Sr	3.18	0.07	Hardness (as $CaCO_3$)		260	5.20
Barium	Ba	7.4					
Copper	Cu	0.10		Total dissolved minerals		342	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	<0.05		Turbidity		1	
Lithium	Li	0.01		Color		0	
Nickel	Ni	<0.05		Odor		H_2S (at well)	
Zinc	Zn	0.26	0.01	Temp. (reported)		56.5F	

A description of the wells serving the West Side Treatment Plant follows:

WELL NO. 1A, open to the Cambrian-Ordovician aquifer, was completed in June 1963 to a depth of 1305 ft (cleaned out to 1268 ft) by the Layne-Western Co., Aurora. The well is located about 600 ft west of the West Side Treatment Plant near the southwest corner of the south lagoon, approximately 1865 ft N and 2590 ft W of the SE corner of Section 16, T41N, R8E. The land surface elevation at the well is approximately 840 ft.

A drillers log of Well No. 1A follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Surface	5	5
Sand	10	15
Sand and gravel	10	25
Blue clay and gravel	45	70
Soft white sand	5	75
Blue clay and gravel	45	120
Soft gray sand	12	132
Hard gray limestone	13	145
Medium gray shale and limestone	50	195
Medium gray shale	11	206
Dark gray limestone	29	235
Dark gray limestone and shale	40	275
Gray limestone	45	320
Medium gray shale	31	351
Gray limestone	14	365
Medium brown limestone	10	375
Medium gray limestone	293	668
Medium white sandstone	7	675
Soft white sandstone	25	700
Medium gray sandstone	15	715
Hard gray sandstone	5	720
Gray sandy limestone	20	740
Soft white sandstone	55	795
Sandstone and green shale breaks	13	808
Medium white sandstone	17	825
Soft white sandstone	35	860
Medium white sandstone	20	880
Hard white sandstone	8	888
Hard brown sandy limestone	2	890
Limestone and shale	15	905
Red sandy shale	5	910
Medium white sandstone	14	924
Green shale	1	925
Limestone red and gray	10	935
Hard limestone	115	1050
Red sandy limestone, hard	5	1055
Sandy limestone and shale	25	1080
Sandy limestone	30	1110
Hard gray limestone	10	1120
Hard sandstone	10	1130
Hard white sandy limestone	10	1140
Hard white sandstone	15	1155
Hard white sandstone and lime shells	10	1165
Hard white sandstone	30	1195
Medium white sandstone	30	1225
Soft white sandstone	35	1260
Sandy red limestone	5	1265
Gray limestone	20	1285
Medium gray sandy limestone	5	1290
Hard gray sandstone and limestone	5	1295
Hard gray limestone and shale	10	1305

A 26-in. diameter hole was drilled to a depth of 135 ft, reduced to 25.2 in. between 135 and 366 ft, reduced to 21.2 in. between 366 and 956 ft, and finished 17.2 in. in diameter from 956 to 1305 ft. The well is cased with 26-in. pipe from land surface to a depth of 135 ft, 22-in. pipe from land surface to a depth of 366 ft (cemented in), and 18-in. liner from 869 to 956 ft. The top of the casing is equipped with a pitless adapter.

A production test was conducted by the driller on July 1-2, 1963. After 24 hr of pumping at rates ranging from 589 to 755 gpm, the final drawdown was 177 ft from a non-pumping water level of 371 ft below land surface.

After shooting with eight 50-qt shots of liquid glycerin at 1245 to 1258 ft, 1225 to 1238 ft, 1209 to 1218 ft, 1200 to 1209 ft, 1169 to 1178 ft, 1160 to 1169 ft, 1139 to 1148 ft, and 1130 to 1139 ft, the well was cleaned out to 1268 ft. A production test was then conducted by the driller on July 31, 1963. After 16 hr of pumping at rates ranging from 650 to 1401 gpm, the final drawdown was 145 ft from a non-pumping water level of 374 ft below land surface.

The pumping equipment presently installed is a Layne & Bowler submersible turbine pump set at 760 ft, rated at 1500 gpm, and powered by a 300-hp General Electric motor.

A partial analysis of a sample (Lab. No. 160585) collected during the initial production test, after pumping for 24 hr at 735 gpm, showed the water to have a hardness of 244 mg/l, total dissolved minerals of 342 mg/l, and an iron content of 0.2 mg/l.

WELL NO. 2A, open to the Cambrian-Ordovician aquifer, was completed in February 1964 to a depth of 1353 ft by the Layne-Western Co., Aurora. The well is located 75 ft west of the elevated tank at the West Side Treatment Plant, approximately 2100 ft N and 2040 ft W of the SE corner of Section 16, T41N, R8E. The land surface elevation at the well is approximately 860 ft.

A drillers log of Well No. 2A follows:

Strata	Thickness (ft)	Depth (ft)
Soft yellow sand	25	25
Soft yellow sandy clay	40	65
Soft blue clay and sand	10	75
Blue clay, sand and gravel	50	125
Blue clay and gravel	32	157
Medium gray limestone	13	170
Medium gray limestone and shale	55	225
Medium dark gray limestone	110	335
Hard dark gray limestone	8	343
Medium blue shale	12	355
Medium gray shale	20	375
Hard gray limestone	10	385
Medium gray limestone	195	580
Hard gray limestone	25	605
Medium dark gray limestone	90	695
Medium white sandstone	10	705
Soft white sandstone	40	745
Hard gray sandy limestone	5	750
Hard gray limestone	10	760
Soft white sandstone	105	865
Medium white sandstone	35	900
Soft white sandstone	15	915
Hard white sandy limestone	5	920
Medium limestone with shale breaks	5	925
Medium gray sandy limestone	5	930
Hard gray limestone	5	935
Hard shale	5	940
Medium red sandy shale	5	945
Medium sand, red and green shale breaks	10	955
Hard sandy limestone	5	960
Hard gray limestone	55	1015
Hard buff limestone	30	1045
Hard gray limestone	15	1060
Hard sandy limestone	40	1100
Medium sandy limestone	20	1120
Hard gray sandy limestone	10	1130
Hard gray limestone	5	1135
Hard white sandy limestone	20	1155
Medium white sandstone	40	1195
Medium white sandy limestone	10	1205
Hard white sandstone	35	1240
Medium white sandstone	5	1245
Hard white sandstone	5	1250
Medium white sandstone	10	1260
Hard white sandstone	5	1265
Medium white sandstone	38	1303
Hard gray sandy limestone and shale	12	1315
Hard, dark, gray sandy shale	5	1320
Hard dark gray limestone	15	1335
Hard dark gray limestone and shale	18	1353

A 25-in. diameter hole was drilled to a depth of 390 ft, reduced to 21.2 in. between 390 and 975 ft, and finished 17.2 in. in diameter from 975 to 1353 ft. The well is cased with 26-in. drive pipe from land surface to a depth of 161 ft, 22-in. pipe from land surface to a depth of 390 ft (cemented in), and 18-in. liner from 901 ft to a depth of 975 ft.

After the well was shot with four 50-qt shots of liquid glycerin at 1260 to 1294 ft, 1230 to 1250 ft, 1205 to 1225 ft, and 1165 to 1199 ft, a production test was conducted by the driller on February 17-20, 1964. After 2 hr of pumping at rates of 698 to 799 gpm, the drawdown was 79 ft from a nonpumping water level of 396 ft below land surface. Pumping was continued for 1.5 hr at a rate of 956 gpm with a drawdown of 96 ft. Pumping was continued for 4 hr at rates of 1104 to 1094 gpm with a drawdown of 112 ft. After an additional 64.5 hr of pumping at rates ranging from 1200 to 1416 gpm, the final drawdown was 136 ft. Ten min after pumping was stopped, the water level had recovered to 420 ft.

The pumping equipment presently installed is a Layne & Bowler submersible pump set at 761 ft, rated at 1500 gpm, and powered by a 300-hp General Electric motor.

A mineral analysis of a sample (Lab. No. 186200) collected July 13, 1971, after pumping for 24 hr, showed the water to have a hardness of 244 mg/l, total dissolved minerals of 319 mg/l, a barium content of 2.0 mg/l, and a trace of iron. Hydrogen sulfide also was apparent when this sample was collected.

WELL NO. 3A, open to the Cambrian-Ordovician aquifer, was completed in August 1967 to a depth of 1378 ft by the Layne-Western Co., Aurora. The well is located in the northwest corner of the school yard north of the treatment plant, approximately 2565 ft N and 2590 ft W of the SE corner of Section 16, T41N, R8E. The land surface elevation at the well is approximately 860 ft.

A drillers log of Well No. 3A follows:

Strata	Thickness (ft)	Depth (ft)
No record	60	60
Soft gray clay	5	65
Brown clay and gravel	80	145
Medium gray broken limestone	5	150
Brown sand and gravel	5	155
Limestone, sand and gravel	3	158
Hard gray limestone	12	170
Green shale with sand streaks	5	175
Green shale with limestone streaks	55	230
Hard dark gray limestone	110	340
Limestone with green shale streaks	5	345
Gray shale	5	350
Gray shale, with limestone streaks	27	377
Hard gray limestone	28	405
Medium gray limestone	160	565
Hard gray limestone	60	625
Medium gray limestone with hard streaks	15	640
Sandy broken limestone	20	660
Medium gray limestone	38	698
Medium white sandstone	17	715
Soft white sandstone	20	735
Medium white sandstone	15	750
Hard gray limestone	5	755
Medium gray limestone	5	760
Soft white sandstone	50	810
Medium hard white sandstone	15	825
Medium white sandstone	85	910
Medium sandy limestone	10	920
Hard sandy limestone	5	925
Hard gray shale	5	930
Shale and limestone streaks	6	936
Medium blue shale	4	940
Medium brown sandstone	15	955
Hard brown limestone	5	960
Hard sandy limestone	5	965
Medium hard sandstone	5	970
Hard gray limestone	5	975
Hard brown limestone	95	1070
Dark brown sandy limestone and red shale streaks	15	1085
Medium red sandy limestone	25	1110
Sandy blue limestone, shale and mud	10	1120
Medium gray sandstone	10	1130
Gray shale	5	1135
Hard red limestone	5	1140

Strata (continued)	Thickness (ft)	Depth (ft)
Hard sandy limestone	10	1150
Hard gray sandy limestone	23	1173
Medium white sandstone	52	1225
Hard white sandstone	10	1235
Medium white sandstone	40	1275
Soft white sandstone	30	1305
Medium white sandstone	10	1315
Hard white sandstone	10	1325
Green shale	5	1330
Very hard limestone and chert	10	1340
Limestone and chert with streaks of green shale	5	1345
Gray limestone and shale	33	1378

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. B20292) is for a water sample from the well collected November 15, 1976, after 1 hr of pumping at 1160 gpm.

WELL NO. 3A, LABORATORY NO. B20292

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.0		Silica	SiO_2	8.2	
Manganese	Mn	0.00		Fluoride	F	0.7	0.04
Ammonium	NH_4	0.5	0.03	Boron	B	0.2	
Sodium	Na	37	1.61	Nitrate	NO_3	0.0	0.00
Potassium	K	9.9	0.25	Chloride	Cl	40	1.13
Calcium	Ca	64	3.19	Sulfate	SO_4	0.0	0.00
Magnesium	Mg	25	2.06	Alkalinity (as $CaCO_3$)		296	5.92
Arsenic	As	0.00		Hardness (as $CaCO_3$)		262	5.24
Barium	Ba	10.1					
Copper	Cu	0.01					
Cadmium	Cd	0.00		Total dissolved			
Chromium	Cr	0.00		minerals		353	
Lead	Pb	0.00					
Mercury	Hg	0.0002					
Nickel	Ni	0.0					
Selenium	Se	0.00					
Silver	Ag	0.00					
Cyanide	CN	0.00					
Zinc	Zn	0.0		pH (as rec'd)		7.4	

A 25.2-in. diameter hole was drilled to a depth of 390 ft and finished 21.2 in. in diameter from 390 to 1378 ft. The well is cased with 26-in. steel drive pipe from land surface to a depth of 159.2 ft and 22-in. steel pipe from land surface to a depth of 390.3 ft (cemented in).

A production test was conducted by the driller on August 15, 1967. After 2.5 hr of pumping at rates of 394 to 334 gpm, the drawdown was 130 ft from a nonpumping water level of 435 ft. On August 16, 1967, the well was tested again for 6.7 hr at rates of 366 to 330 gpm with a drawdown of 125 ft from a nonpumping water level of 445 ft.

The well was shot with 100 qt of nitroglycerin as follows: 20 qt at 1190 ft, 20 qt at 1230 ft, 20 qt at 1265 ft, 20 qt at 1290 ft, and 20 qt at 1315 ft. After shooting, a production test was conducted by the driller on August 29-30, 1967. After 23 hr of pumping at rates ranging from 600 to 863 gpm, the final drawdown was 136 ft from a nonpumping water level of 435 ft below the top of the casing.

A production test was conducted by the driller on September 13, 1967. After 12.5 hr of pumping at rates ranging from 1084 to 1012 gpm, the drawdown was 158 ft from a nonpumping water level of 445 ft. Two hr after pumping was stopped, the water level had recovered to 480 ft.

The pumping equipment presently installed consists of a 300-hp General Electric motor, a 14-in., 10-stage Layne & Bowler submersible pump set at 716 ft, rated at about 1500 gpm, and has 716 ft of 10-in. column pipe. The well is equipped with 716 ft of airline.

WELL NO. 4A, open to the Cambrian-Ordovician aquifer, was completed in May 1972 to a depth of 1345 ft by the Layne-Western Co., Aurora. The well is located just east of the West Side Treatment Plant, approximately 2000 ft N and 1000 ft W of the SE corner of Section 16, T41N, R8E. The land surface elevation at the well is approximately 835 ft.

A drillers log of Well No. 4A follows:

Strata	Thickness (ft)	Depth (ft)
Black top soil	2	2
Sandy yellow clay	8	10
Yellow sandy gravel	35	45
Gray clay	10	55
Sandy clay and boulders	20	75
Clay	25	100
Gravel	20	120
Hard gray limestone	25	145
Hard limestone with shale streaks	35	180
Shale	15	195
Hard limestone	25	220
Limestone with shale streaks	25	245
Shale	30	275
Limestone and shale	35	310
Sticky shale	30	340
Hard brown limestone	95	435
Hard gray limestone	230	665
Hard gray sandy limestone	5	670
Hard white sandstone	30	700
Medium white sandstone	15	715
Hard white sandstone	5	720
Hard gray limestone	15	735
Hard gray sandstone	55	790
Medium white sandstone	15	805
Hard white sandstone	10	815
Medium white sandstone	10	825
Hard white sandstone	65	890
Hard sandy limestone	10	900
Hard gray limestone	5	905
Gray sandy limestone with red shale streaks, hard	15	920
Medium sand and shale streaks	5	925
Hard pink limestone	45	970
Hard gray limestone	70	1040
Hard sandy gray limestone	10	1050
Medium red limestone	15	1065
Medium red sandy limestone	30	1095
Hard gray sandy limestone	45	1140
Medium gray sandstone	55	1195
Medium white sandstone	95	1290
Hard sandy limestone and shale	10	1300
Hard gray shale	45	1345

A 25-in. diameter hole was drilled to a depth of 359 ft and finished 21.2 in. in diameter from 359 to 1345 ft. The well is cased with 26-in. pipe from land surface to a depth of 128 ft and 22-in. pipe from land surface to a depth of 359 ft (cemented in).

A production test was conducted by the driller on May 16-17, 1972. After 26.4 hr of intermittent pumping at rates ranging

from 1104 to 1506 gpm, the final drawdown was 220 ft from a nonpumping water level of 448 ft below land surface.

The pumping equipment presently installed consists of a 300-hp Byron Jackson electric motor, a 12-in., 11-stage Byron Jackson submersible pump set at 800 ft, rated at 1200 gpm at at about 790 ft TDH, and has 800 ft of 10-in. column pipe.

A partial analysis of a sample (Lab. No. 188649) collected during the initial production test, after pumping for 27 hr at 1143 gpm, showed the water to have a hardness of 254 mg/l, total dissolved minerals of 332 mg/l, a barium content of 7.2 mg/l, and a trace of iron.

WELL NO. 5A, open to the Cambrian-Ordovician aquifer, was completed in February 1977 to a depth of 1310 ft by the Layne-Western Co., Aurora. The well is located on Edgewood St. at Foothill St., approximately 1650 ft N and 1300 ft E of the SW corner of Section 16, T41N, R8E. The land surface elevation at the well is approximately 822 ft.

A drillers log of Well No. 5A follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Peat - top soil	3	3
Sandy clay some gravel	108	111
Gray limestone	59	170
Dark gray limestone	20	190
Dark gray limestone (shaley)	65	255
Dark gray limestone	72	327
Brown limestone	138	465
Light brown and gray limestone	130	595
Limestone - dolomite (cherty)	70	665
Limestone - dolomite (shaley)	15	680
Sandstone trace of shale	225	905
Sandstone trace of limestone	20	925
Red and brown sandstone	13	938
Sandy limestone brown and gray	32	970
Hard limestone	55	1025
Shaley limestone	25	1050
Red shale trace of green shale	15	1065
Limestone shale	10	1075
Limestone - trace of blue-green shale	20	1095
Brown sandy limestone hard lumps	35	1130
Pink sandstone	5	1135
White sandstone	55	1190
Hard sandstone, white	10	1200
Sandy dolomite trace of shale	5	1205
White and red sandstone with trace of white shale	40	1245
Brown and red sandy dolomite and shale	30	1275
Gray limestone trace of shale	35	1310

A 28-in. diameter hole was drilled to a depth of 120 ft, reduced to 25.2 in. between 120 and 371 ft, reduced to 21.2 in. between 371 and 1095 ft, and finished 17.2 in. in diameter from 1095 to 1310 ft. The well is cased with 26-in. pipe from land surface to a depth of 119 ft, 22-in. pipe from land surface to a depth of 370 ft (cemented in), and an 18-in. liner from 1014 ft to a depth of 1095 ft. The top of the well casing is equipped with a Baker Monitor pitless adapter.

Upon completion, this well was shot with 5 charges of 20 qt of 100 percent nitrogel per each shot as follows: 1230 to 1240 ft, 1210 to 1220 ft, 1185 to 1195 ft, 1165 to 1175 ft, and 1145 to 1155 ft.

A production test was conducted by the driller on April 18-19, 1977. After 3.8 hr of pumping at a rate of 600 gpm, the drawdown was 120 ft from a nonpumping water level of 425 ft. Pumping was continued for 6 hr at rates of 713 to 933 gpm with a drawdown of 170 ft. Pumping was continued for 6.5 hr at rates ranging from 1059 to 1064 gpm with a drawdown of 183 ft. Pumping was continued for 2.8 hr at a rate of 600 gpm with a drawdown of 128 ft. After a 5.1-hr idle period, pumping was continued for 3 hr at rates ranging from 728 to 1379 gpm with a maximum drawdown of 210 ft. Thirty-five min after pumping was stopped, the water level had recovered to 475 ft.

A second production test was conducted by the driller on May 5-6, 1977. After 3 hr of pumping at rates ranging from 1059 to 1379 gpm, the drawdown was 160 ft from a nonpumping water level of 455 ft. Pumping was continued for 15.8 hr at rates of 1610 to 1651 gpm with a final drawdown of 205 ft. The water level recovered to 474 ft after pumping had been stopped for 6.1 hr.

The pumping equipment presently installed consists of a 450-hp Byron Jackson electric motor, a 13-in., 10-stage Byron Jackson submersible pump set at 848 ft, rated at 1400 gpm at about 830 ft TDH, and has 848 ft of 10-in. column pipe.

Other wells located throughout the city are listed as follows:

ERIE ST. WELL, finished in sand and gravel, was completed to a depth of about 40 ft. This well was abandoned in 1931. The well was located at the northwest corner of Clifton Ave. and Erie St., approximately 100 ft N and 2000 ft W of the SE corner of Section 15, T41N, R8E. The land surface elevation at the well is approximately 825 ft.

Details on the casing and screen are not available.

A mineral analysis of a sample (Lab. No. 68116) collected December 3, 1930, showed the water to have a hardness of 472 mg/l, total dissolved minerals of 585 mg/l, and an iron content of 0.4 mg/l.

NORTH STATE ST. WELL, finished in sand and gravel, was completed in 1926 to a depth of 43 ft and deepened in 1928 to a reported depth of 48 ft by the Kelly Well Co., Grand Island, Neb. This well is available for emergency use. The well is located on the northwest corner of State and Washington Sts., approximately 1950 ft S and 1850 ft W of the NE corner of Section 14, T41N, R8E. The land surface elevation at the well is approximately 730 ft.

A partial drillers log of North State St. Well follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Clay	5	5
Gravel	29	34
No record	14	48

The well is cased with 25-in. ID concrete pipe from 18 ft below land surface within a pit to an unknown depth followed by a perforated concrete screen.

On May 30, 1928, after a 12-hr idle period, the nonpumping water level was reported to be 15.7 ft below the floor level of the pit.

In 1934, the well reportedly produced 84 gpm for 20 min with a drawdown of 1.4 ft from a nonpumping water level of 25.0 ft below land surface.

In 1946, after pumping at a rate of 215 gpm, the drawdown was 5.5 ft from a nonpumping water level of 12.5 ft below the pump base or 28.5 ft below land surface.

In 1948, the well reportedly produced 215 gpm for 12 hr with a drawdown of 5 ft from a nonpumping water level of 15 ft below the pump base.

The pumping equipment presently installed is an 8-in., 6-stage Byron Jackson turbine pump set at 21 ft, operated at about 235 gpm, and powered by a 25-hp Westinghouse electric motor.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. C004347) is for a water sample from the well collected December 11, 1973, after 24 hr of pumping at 300 gpm.

NORTH STATE ST. WELL, LABORATORY NO. C004347

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.0		Silica	SiO_2	18	
Manganese	Mn	0.00		Fluoride	F	0.2	0.01
Ammonium	NH_4	0.23	0.01	Boron	B	0.4	
Sodium	Na	37	1.61	Nitrate	NO_3	11.9	0.19
Potassium	K	3.9	0.10	Chloride	Cl	75	2.12
Calcium	Ca	102	5.09	Sulfate	SO_4	98	2.04
Magnesium	Mg	48	3.95	Alkalinity (as $CaCO_3$)		344	6.88
Arsenic	As	0.00		Hardness (as $CaCO_3$)		452	9.04
Barium	Ba	0.0					
Copper	Cu	0.01		Total dissolved minerals		606	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)		7.6	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		0.5	
Silver	Ag	0.00		± deviation		1.6	
Cyanide	CN	0.00		Beta *pc/l*		4.6	
Zinc	Zn	0.01		± deviation		2.5	

Closest well

CRIGHTON AVE. WELL, finished in sand and gravel, was completed in 1928 to a depth of 53 ft (reported in 1933 to be 48.6 ft deep) by the Kelly Well Co., Grand Island, Neb. This well is available for emergency use. The well is located on the west side of Crighton Ave. between West Chicago St. and Pennsylvania Ave., approximately 2050 ft N and 1230 ft E of the SW corner of Section 14, T41N, R8E. The land surface elevation at the well is approximately 795 ft.

The well is cased with 25-in. ID concrete pipe from above the floor of a 6-ft deep pit to an unknown depth followed by a perforated concrete screen.

In January 1933, the well reportedly produced 203 gpm with a drawdown of 23 ft from a nonpumping water level of 19 ft below the top of the well.

On June 30, 1948, the well reportedly produced 200 gpm for 12 hr with a drawdown of 10 ft from a nonpumping water level of 8 ft below the pump base.

The pumping equipment presently installed consists of a 15-hp U. S. electric motor, an 8-in., 6-stage American Well Works turbine pump (No. 55175) set at 40 ft, rated at 200 gpm at about 152 ft TDH, and has 40 ft of 6-in. column pipe. A 7-ft section of 5-in. suction pipe is attached to the pump intake.

A mineral analysis of a sample (Lab. No. 115154) collected June 30, 1948, after pumping for 12 hr at 200 gpm, showed the water to have a hardness of 576 mg/l, total dissolved minerals of 628 mg/l, and an iron content of 0.1 mg/l.

LAUREL ST. WELL, finished in sand and gravel was completed in 1928 to a depth of 53 ft by the Kelly Well Co., Grand Island, Neb. This well was abandoned in 1931. The well was located at the east end of Laurel St. at the southwest intersection of Illinois Ave., approximately 1300 ft N and 700 ft W of the SE corner of Section 13, T41N, R8E. The land surface elevation at the well is approximately 740 ft.

A drillers log of Laurel St. Well follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Soil	4	4
Sand	2	6
Gravel	47	53
Blue clay		

The well was cased with 25-in. ID concrete pipe from 1 ft below land surface to a depth of about 18 ft. A perforated concrete screen of the same size extends from about 18 to 53 ft.

Upon completion, the nonpumping water level was reported to be 2.8 ft below the top of the casing.

A mineral analysis of a sample (Lab. No. 67202) collected August 13, 1930, showed the water to have a hardness of 531 mg/l, total dissolved minerals of 638 mg/l, and an iron content of 0 mg/l.

To alleviate a water shortage, in the summer of 1931 a group of four shallow wells owned by the Borden Milk Co. were purchased by the city. These wells, finished in sand and gravel, were located about 30 ft east of the Fox River about 375 to 450 ft south of the center of Kimball St., approximately 1330 ft S and 1450 ft W of the NE corner of Section 14, T41N, R8E. Three of these wells were 6 in. in diameter and 46 ft deep, and one was 12 in. in diameter and 36 ft deep. These wells were abandoned in 1934 and sealed in 1942.

SHULER ST. WELL, open to the Cambrian-Ordovician and the Elmhurst-Mt. Simon aquifers, was completed in 1931 to a depth of 1940 ft by the Varner Well and Pump Co., Dubuque, Iowa. This well is not in service and has been capped. The well is located near the southwest corner of Shuler St. and Commonwealth Ave., approximately 850 ft N and 250 ft E of the SW corner of Section 14, T41N, R8E. The land surface elevation at the well is approximately 821 ft.

A sample study log of Shuler St. Well furnished by the State Geological Survey follows:

Strata	Thickness (ft)	Depth (ft)
PLEISTOCENE SERIES		
Glacial drift	104	104
SILURIAN SYSTEM		
Alexandrian Series		
Dolomite, light gray to buff, medium	36	140
ORDOVICIAN SYSTEM		
Maquoketa Group		
Dolomite, buff and light green, argillaceous; shale, green, dolomitic	170	310
Shale, dark brown and dark greenish gray	30	340
Galena Group		
Dolomite, light gray, medium, slightly cherty	200	540
Platteville Group		
Dolomite, slightly cherty, buff to gray, fine to very fine	120	660
Ancell Group		
Glenwood Formation		
Dolomite, sandy, buff to gray; sandstone, partly dolomitic, fine to medium, buff, partly incoherent	100	760
St. Peter Sandstone		
Sandstone, white to buff, fine to medium, incoherent; shale, dolomitic, sandy, green at base	190	950
CAMBRIAN SYSTEM		
Eminence-Potosi Dolomite		
Dolomite, gray to light buff, fine to medium, very glauconitic in lower part	100	1050
Franconia Formation		
Sandstone, very glauconitic, pink; shale, glauconitic, sandy, green	50	1100
Ironton-Galesville Sandstone		
Sandstone, fine to coarse, white, incoherent	200	1300
Eau Claire Formation		
Shale, dolomitic, greenish-gray; siltstone, dolomitic, glauconitic, light gray-buff, greenish; shale, greenish gray, firm; all interbedded; siltstone, very dolomitic, gray-buff	380	1680
Mt. Simon Sandstone		
Sandstone, light buff, fine to coarse, incoherent	260	1940

A 22-in. diameter hole was drilled to a depth of 106.3 ft, reduced to 20 in. between 106.3 and 210 ft, reduced to 17 in. between 210 and 955 ft, reduced to 15 in. between 955 and 1463 ft, and finished 12 in. in diameter from 1463 to 1940 ft. The well is cased with 22-in. pipe from land surface to a depth of 106.3 ft, 18-in. OD pipe from land surface to a depth of 210 ft, 16-in. OD liner from 890 ft to a depth of 955 ft, and 12-in. liner from 1280 ft to a depth of 1463 ft.

During drilling at a depth of 1852 ft, a 26-hr production test was conducted. After 5 hr of pumping at rates of 850 to 900 gpm, the drawdown was 197 ft from a nonpumping water level of 93 ft below land surface. The water level did not return to its prior level of 93 ft but remained at 180 ft while drilling was continued to the 1940 ft depth.

Upon completion, the well reportedly produced 760 gpm for 8 hr with a drawdown of 158 ft from a nonpumping water level of 180 ft below land surface.

The production of the well dropped to 460 gpm in 1933 and the pump was removed for inspection. It was found in good condition and replaced but the production continued to diminish until in September 1944 the pump broke suction at the end of 5 min operation. The pump was removed and a water level recorder installed in the well on March 12, 1946. The distance to water on that date was 110.1 ft below the top of the casing and in November 1946 the depth of water was 109.0 ft.

A mineral analysis of a sample (Lab. No. 69718) collected October 2, 1931, showed the water to have a hardness of 242 mg/l, total dissolved minerals of 395 mg/l, and an iron content of 0.2 mg/l.

Two test holes, located in Sections 1 and 2, T41N, R8E, were drilled in January and February 1961 by the Layne-Western Co., Aurora, to depths of 33 and 31 ft deep.

In search for sand and gravel deposits, the Layne-Western Co. drilled five test holes in 1971, ranging in depth from 90 to 154 ft. The test holes were located in Sections 7, 19, and 20, T41N, R9E, Cook County.

ELGIN ESTATES SUBDIVISION (ROLLINS SEWER & WATER CO.)

Elgin Estates Subdivision (Rollins Sewer & Water Co.) (est. 250), located 1 mile southwest of Elgin, installed a public water supply in 1959. The water system is operated by the Midwest Utility Co. One well is in use. In 1963 there were 32 services, all metered; the estimated average daily pumpage was 5300 gpd. In 1974 there were 71 services, all metered; the average and maximum daily pumpages were 20,000 and 40,000 gpd, respectively. The water is chlorinated, fluoridated, and filtered.

WELL NO. 1, open to the Silurian dolomite and the Maquoketa Group, was completed in July 1960 to a depth of 300 ft by the Layne-Western Co., Aurora. The well is located on the north side of Bowes Road midway between Randall Road and McLean Blvd., approximately 2450 ft S and 660 ft W of the NE corner of Section 28, T41N, R8E. The land surface elevation at the well is approximately 805 ft.

A drillers log of Well No. 1 follows:

Strata	Thickness (ft)	Depth (ft)
Top soil	5	5
Gray clay	25	30
Sandy gray clay	20	50
Sand and gravel	25	75

Strata (continued)	*Thickness (ft)*	*Depth (ft)*
Black clay	10	85
Medium gray limestone	43	128
Gray limestone and shale	7	135
Brown medium limestone and shale	10	145
Gray shale	10	155
Gray limestone and shale	26	181
Medium limestone	24	205
Limestone with shale streaks	40	245
Gray shale	5	250
Limestone and shale	5	255
Gray limestone	35	290
Shale and limestone	3	293
Shale	7	300

A 20-in. diameter hole was drilled to a depth of 20 ft, reduced to 12.8 in. between 20 and 87 ft, and finished 12 in. in diameter from 87 to 300 ft. The well is cased with 20-in. steel pipe from land surface to a depth of 20 ft and 12-in. steel pipe from 1 ft above the pump station floor to a depth of 87 ft. The annular opening between the two casings is cement grouted from 0 to 20 ft.

Upon completion, the well reportedly produced 310 gpm for 12 hr with a drawdown of 15 ft from a nonpumping water level of 17 ft.

The pumping equipment presently installed is a Layne & Bowler turbine pump (Type RKHC, Serial No. 42542) set at 40 ft, rated at 300 gpm at about 262 ft head, and powered by a 30-hp 1460 rpm A. O. Smith electric motor (Model No. P326UX4A4-02, Serial No. 2J60).

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. A13811) is for a water sample from the well collected February 12, 1976, after 30 min of pumping at 350 gpm.

WELL NO. 1, LABORATORY NO. A13811

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.85		Silica	SiO_2	21	
Manganese	Mn	0.10		Fluoride	F	0.4	0.02
Ammonium	NH_4	1.86	0.10	Boron	B	0.0	
Sodium	Na	8.0	0.35	Nitrate	NO_3	0.4	0.01
Potassium	K	1.0	0.03	Chloride	Cl	15	0.42
Calcium	Ca	89	4.44	Sulfate	SO_4	80	1.66
Magnesium	Mg	45	3.70	Alkalinity (as $CaCO_3$)		346	6.92
Arsenic	As	0.000		Hardness (as $CaCO_3$)		409	8.18
Barium	Ba	0.0					
Copper	Cu	0.05		Total dissolved minerals		470	
Cadmium	Cd	0.00					
Chromium	Cr	0.00					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)		7.6	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		0.0	
Silver	Ag	0.00		± deviation		1.1	
Cyanide	CN	0.01		Beta *pc/l*		2.6	
Zinc	Zn	0.0		± deviation		1.8	

ELGIN MENTAL HEALTH CENTER (STATE HOSPITAL)

The Elgin Mental Health Center (State Hospital) (est. 2500), located on the south edge of Elgin, installed a public water supply in 1912. Two wells are in use. This supply is cross connected with the city of Elgin. In 1950 with a population of approximately 7200, the estimated average daily pumpage was 1,000,000 gpd. In 1974 with a population of approximately 2500, the average and maximum daily pumpages were 430,000 and 650,000 gpd, respectively. The water is chlorinated.

Water was initially obtained from two 20-ft deep dug wells, each 22 ft in diameter. The wells were located 40 and 110 ft from the edge of the Fox River. These wells were abandoned and sealed between 1950 and 1952.

WELL NO. 1, open to the Cambrian-Ordovician and the Elmhurst-Mt. Simon aquifers, was completed in September 1932 to a depth of 2000 ft (measured at 1987 ft in March 1951) by the Gray-Milaeger Drilling Co., Milwaukee, Wis. The well is located at 750 South State St. in a room of the tin shop in the power plant area, approximately 1275 ft N and 1775 ft W of the SE corner of Section 23, T41N, R8E. The land surface elevation at the well is approximately 750 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Gravel fill	3	3
Soil, black and clay	5	8
Gravel, coarse, dry	2	10
Sand, hard; stonelike, dry	2	12
Gravel, coarse, dry	6	18
Gravel, fine; water	20	38
Sand, muddy and gravel	15	53
Quicksand, gray	5	58
Shale, gray, muddy	2	60
Limestone, gray; broken	4	64
Limestone, gray	10	74
Limestone, yellow, hard	6	80
Limestone, gray	10	90
Limestone, gray and pink shale	5	95
Shale, bluish gray, muddy	50	145
Limestone, gray, shaley	100	245
Shale, muddy and lime shells	35	280
Limestone, light gray	20	300
Limestone, hard, yellow	45	345
Limestone, yellow; not so hard	20	365
Limestone, light gray	125	490
Limestone, yellow, very hard	25	515
Limestone, light gray, blue spots	15	530
Limestone, light brown, blue spots	70	600
Limestone, light gray	4	604
Sandstone, light gray	6	610

Strata (continued)	*Thickness (ft)*	*Depth (ft)*
Sandstone, white; fine	5	615
Sandstone, light gray	5	620
Sandstone, white; fine	20	640
Sandstone, white, coarse	10	650
Sandstone, green shale	10	660
Sand, gray and limestone	20	680
Sandstone, white; yellow tint	170	850
Sandstone, white; medium fine to coarse	40	890
Sand, white; lime shells	10	900
Shale, gray and green, muddy	10	910
Sandstone, white	15	925
Shale, sandy, green	10	935
Limestone, light brown	40	975
Lime, light brown, sandy; pink tint	10	985
Lime, brown; red marl, shale	25	1010
Lime, sandy; pink marl	5	1015
Sandstone, pink marl	5	1020
Sandstone, light gray; green shale	20	1040
Sandstone, gray, green shale	20	1060
Sand and lime; pink, green shale	10	1070
Sand and lime, white to buff	20	1090
Sandstone, white to gray	35	1125
Sandstone, hard, lime shells	15	1140
Sandstone, fine, white, yellow	30	1170
Sandstone, white	25	1195
Sandstone, white, pink tint	25	1220
Sandstone, light gray, hard	10	1230
Sand, gray, white lime shells	10	1240
Lime, sandy, dark gray	10	1250
Shale, bluish gray; lime shells	2	1252
Shale, dark gray, tough, limestone, gray	13	1265
Limestone, gray and brown, shale streaks	10	1275
Limestone, gray and brown, shale	45	1320
Shale, reddish brown; lime shells	20	1340
Limestone, reddish brown; shale	20	1360
Shale, gray, red, green; lime shells	10	1370
Limestone, gray and shale	5	1375
Sandstone, gray, greenish, hard, sharp	10	1385
Sandstone, hard, fine, white, dolomitic	35	1420
Sand, gray, and limestone	10	1430
Dolomite, dark gray, sandy	10	1440
Sandstone, gray, hard, fine	10	1450
Dolomite, gray, very little sand	80	1530
Lime, gray and yellow, green shale	5	1535
Sandstone, gray and green, green shale	10	1545
Dolomite, gray	20	1565
Dolomite, gray, shale	10	1575
Dolomite, gray and shale	40	1615
Dolomite, gray, buff	5	1620
Sandstone, gray; dolomitic	15	1635
Sandstone, light buff	45	1680
Sandstone, pink marl	290	1970
Sandstone; blue and gray shale	30	2000

A 20-in. diameter hole was drilled to a depth of 300 ft, reduced to 17 in. between 300 and 1060 ft, and finished 15 in. in diameter from 1060 to 2000 ft. The well is cased with 20-in. OD drive pipe from 0.7 ft above the pumphouse floor to a depth of 64 ft, 18-in. OD welded pipe from the pumphouse floor to a depth of 300 ft, and a 16-in. OD liner from 816 ft to a depth of 1060 ft.

A production test was conducted by the hospital in October 1932. After 48 hr of pumping at an average rate of 1365 gpm, the drawdown was 90 ft from a nonpumping water level of 45 ft below land surface.

On February 26, 1945, the well reportedly produced 800 gpm for 20 hr with a drawdown of 115 ft from a nonpumping water level of 50 ft below land surface.

On November 29, 1951, the well reportedly produced 770 gpm for 2 hr with a drawdown of 155 ft from a nonpumping water level of 53 ft.

A production test was conducted on May 27-28, 1953, by representatives of the Layne-Western Co., Aurora, the hospital, and the State Water Survey. After 18.6 hr of pumping at rates ranging from 976 to 1051 gpm, the final drawdown was 250.5 ft from a nonpumping water level of 67.0 ft. Thirty-eight min after pumping was stopped, the water level had recovered to 94.0 ft.

After a new pump was installed, a production test was conducted on July 19, 1954, by representatives of the Layne-Western Co. and the State Water Survey. After 1.4 hr of pumping at 1100 gpm, the drawdown was 268.2 ft from a nonpumping water level of 48.6 ft below the top of the casing. Forty-nine min after pumping was stopped, full recovery was observed.

A production test was conducted on September 7, 1954, to check on the performance characteristics of the new pump and on the problem of air appearing in the water pumped from the well. After 2.4 hr of pumping at rates ranging from 1240 to 975 gpm, the final drawdown was 274 ft from a nonpumping water level of 46 ft.

The pumping equipment presently installed consists of a 200-hp 1800 rpm U. S. electric motor (Serial No. 982727), a 12-in., 9-stage Layne turbine pump (No. 27761) rated at 1000 gpm at about 555 ft TDH, and has 550 ft of 10-in. column pipe.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. A15005) is for a water sample from the well collected March 1, 1976, after 50 min of pumping at 900 gpm.

WELL NO. 1, LABORATORY NO. A15005

		mg/l	*me/l*			*mg/l*	*me/l*
Iron	Fe	0.1		Silica	SiO_2	14	
Manganese	Mn	0.05		Fluoride	F	0.2	0.01
Ammonium	NH_4	0.39	0.02	Boron	B	0.3	
Sodium	Na	30	1.30	Nitrate	NO_3	7.9	0.13
Potassium	K	2.5	0.06	Chloride	Cl	57	1.61
Calcium	Ca	98	4.89	Sulfate	SO_4	160	3.33
Magnesium	Mg	54	4.44	Alkalinity (as $CaCO_3$)		304	6.08
Arsenic	As	0.000		Hardness (as $CaCO_3$)		465	9.30
Barium	Ba	0.0					
Copper	Cu	0.05		Total dissolved			
Cadmium	Cd	0.00		minerals		670	
Chromium	Cr	0.05					
Lead	Pb	0.00					
Mercury	Hg	0.0000		pH (as rec'd)		7.3	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		0.2	
Silver	Ag	0.00		± deviation		1.8	
Cyanide	CN	0.01		Beta *pc/l*		4.9	
Zinc	Zn	0.0		± deviation		2.3	

WELL NO. 2, open to the Ironton-Galesville Sandstone of the Cambrian-Ordovician aquifer and the Elmhurst-Mt. Simon aquifer, was constructed in July 1947 to a depth of 1290 ft, and deepened in June 1951 to a reported depth of 2000 ft by the Layne-Western Co., Aurora. The well is located

in a brick building about 1 block west of the main hospital elevated tank, approximately 925 ft N and 1750 ft E of the SW corner of Section 23, T41N, R8E. The land surface elevation at the well is approximately 755 ft.

A sample study log of Well No. 2 furnished by the State Geological Survey follows:

Strata	*Thickness (ft)*	*Depth (ft)*
PLEISTOCENE SERIES		
Silt, sandy, brownish red, gravelly at base	15	15
Gravel, granular, silty	10	25
Sand and gravel, silty	40	65
SILURIAN SYSTEM		
Niagaran Series		
Dolomite, light buff to light yellow	18	83
Alexandrian Series		
Dolomite, white to light buff, fine to medium; dolomite, pale green, very fine at base	52	135
ORDOVICIAN SYSTEM		
Maquoketa Group		
Shale, greenish gray, weak; dolomite, light green to gray, fine to coarse	55	190
Dolomite, light gray to brown; shale, brown, tough	140	330
Galena Group		
Dolomite, light gray to light buff, fine to medium, crystalline	225	555
Platteville Group		
Dolomite, light greenish gray to buff, brown, very fine to coarse	60	615
Ancell Group		
Glenwood Formation		
Sandstone, light gray, white, fine to medium, incoherent	73	688
St. Peter Sandstone		
Sandstone, yellowish gray, fine to coarse, incoherent	152	840
Chert, white; shale light gray to light brown, green, weak	30	870
Sandstone, white, fine to coarse, incoherent	5	875
CAMBRIAN SYSTEM		
Eminence-Potosi Dolomite		
Dolomite, light pinkish buff and grayish green, fine to medium	125	1000
Franconia Formation		
Sandstone, white, light pink, buff to green, very fine to medium; incoherent; little shale, light gray; little dolomite, pink	105	1105
Ironton-Galesville Sandstone		
Sandstone, white, fine to coarse, incoherent	155	1260
Eau Claire Formation		
Sandstone, buff, very fine to medium; shale, light green to grayish brown, weak, brittle; dolomite, sandy	30	1290
Shale, greenish pink, weak; sandstone yellowish orange, grayish green, fine to coarse, incoherent to compact	150	1440
Dolomite, gray, yellowish gray, fine to coarse; shale, green, weak	230	1670
Mt. Simon Sandstone		
Sandstone, silty, yellowish orange pink, very fine to very coarse, rounded to angular, incoherent	330	2000

A 30-in. diameter hole was drilled to a depth of 74 ft, reduced to 24 in. between 74 and 440 ft, reduced to 19 in. between 440 and 940 ft, reduced to 15.2 in. between 940 and 1290 ft, and finished 10 in. in diameter from 1290 to 2000 ft. The well is cased with 30-in. OD drive pipe from 1 ft above the pumphouse floor to a depth of 74 ft and 20-in. pipe from land surface to a depth of 436 ft (cemented in). Originally a 16-in. OD slotted liner was installed from 840 ft to a depth of 940 ft. In 1950 the 16-in. liner was removed and a 16-in. OD casing was installed from land surface to a depth of 688 ft (cemented in) and a 12-in. perforated liner was set from 839 ft to a depth of 958 ft. During deepening in 1951, the 12-in. perforated liner was removed and a 10-in. liner was installed from 667 ft to a depth of 1010 ft (cemented in).

A production test was conducted on July 30-31, 1947, by representatives of the driller, the State Water Survey, the hospital, and the Division of Architecture & Engineering. After 24.3 hr of pumping at rates of 550 to 1100 gpm, the final drawdown was 51.0 ft from a nonpumping water level of 191.0 ft below the top of the casing. The water level recovered to 212.5 ft after pumping was stopped for 3.2 hr. During this test, Well No. 1 was pumping continuously.

Before rehabilitation, a production test was conducted on November 14, 1949, by representatives of the driller, the State Water Survey, and the hospital. The well reportedly produced 720 to 1050 gpm for 2.5 hr with a drawdown of 28 ft from a nonpumping water level of 202 ft below the top of the airline.

This well was rehabilitated by the Layne-Western Co. for the purpose of sealing off certain water-bearing formations which were causing a high hydrogen sulfide content in the water. After installing a new casing and liner, a production test was conducted on February 13-14, 1950, by representatives of the driller, the State Water Survey, and the hospital. The well reportedly produced 650 to 1100 gpm for 22 hr with a drawdown of 131 ft from a nonpumping water level of 195 ft below the pump base. Forty-five min after pumping was stopped, the water level had recovered to 222 ft.

On June 12, 1950, with a deeper pump setting, a production test was conducted by representatives of the driller, the State Water Survey, and the hospital. After 2.9 hr of pumping at rates of 1250 to 1220 gpm, the drawdown was 125 ft from a nonpumping water level of 207 ft below the pumphouse floor.

After the well was deepened to 2000 ft, a production test was conducted on July 9, 1951, by representatives of the driller, the State Water Survey, and the hospital. After 3.8 hr of pumping at rates ranging from 435 to 660 gpm, the drawdown was 259 ft from a nonpumping water level of 198 ft below the pumphouse floor. When rates of pumping were over 600 gpm, the pump would break suction.

This well was shot on August 29, 1951, with 100 qt of nitroglycerin at the following levels: 1184 to 1245 ft, 1715 to 1730 ft, and 1750 to 1765 ft. The well was then cleaned out to 2000 ft. A production test was conducted August 31-September 1, 1951, by representatives of the driller, the State Water Survey, and the hospital. After 11.8 hr of pumping at rates of 1009 to 1295 gpm, the drawdown was 193 ft from a nonpumping water level of 225 ft.

After lowering the pump in 1964, the well reportedly produced 1100 gpm with a drawdown of 141 ft from a nonpumping water level of 314 ft.

The pumping equipment presently installed consists of a 250-hp 1800 rpm U. S. electric motor, a 10-stage Layne turbine pump (Serial No. 46278) rated at 1000 gpm, and has 550 ft of column pipe. A 10-ft section of 10-in. suction pipe is attached to the pump intake. The well is equipped with 550 ft of airline.

The following mineral analysis made by the Illinois Environmental Protection Agency (Lab. No. A15004) is for a water sample from the well collected March 1, 1976, after 40 min of pumping at 900 gpm.

WELL NO. 2, LABORATORY NO. A15004

		mg/l	me/l			mg/l	me/l
Iron	Fe	0.3		Silica	SiO_2	8	
Manganese	Mn	0.05		Fluoride	F	1.4	0.07
Ammonium	NH_4	0.71	0.04	Boron	B	0.3	
Sodium	Na	11	0.48	Nitrate	NO_3	1.3	0.02
Potassium	K	9.5	0.24	Chloride	Cl	12	0.34
Calcium	Ca	54	2.70	Sulfate	SO_4	20	0.42
Magnesium	Mg	19	1.56	Alkalinity (as $CaCO_3$)		224	4.48
Arsenic	As	0.000		Hardness (as $CaCO_3$)		215	4.30
Barium	Ba	0.2					
Copper	Cu	0.05		Total dissolved			
Cadmium	Cd	0.00		minerals		280	
Chromium	Cr	0.05					
Lead	Pb	0.00					
Mercury	Hg	0.0014		pH (as rec'd)		7.3	
Nickel	Ni	0.0		Radioactivity			
Selenium	Se	0.00		Alpha *pc/l*		11.3	
Silver	Ag	0.00		± deviation		2.4	
Cyanide	CN	0.01		Beta *pc/l*		16.2	
Zinc	Zn	0.0		± deviation		1.9	

FERSON CREEK SUBDIVISION

Ferson Creek Subdivision (est. 318), located 1.5 miles east of Lily Lake, installed a public water supply in 1972. The water system is owned and operated by the Ferson Creek Utilities, Inc. One well (No. 2) is in use. In 1976 there were 91 services, all metered; the average and maximum daily pumpages were 26,275 and 40,000 gpd, respectively. The water is chlorinated and treated with polyphosphate to keep iron in solution.

WELL NO. 1, open to the Cambrian-Ordovician aquifer, was completed in August 1969 to a depth of 1409 ft by the Layne-Western Co., Aurora. This well was disconnected in September 1975. The well is located about 75 ft south of Paddock Lane, approximately 2590 ft S and 1620 ft E of the NW corner of Section 16, T40N, R7E. The land surface elevation at the well is approximately 955 ft.

A drillers log of Well No. 1 follows:

Strata	*Thickness (ft)*	*Depth (ft)*
Brown clay	5	5
Brown clay, trace of sand	7	12
Buff clay, with gravel embedded	241	253
White shale, trace of green	8	261
Shale with streaks of hard limestone	22	283
Hard gray limestone	23	306
Hard gray limestone with streaks of shale	5	311
Broken limestone	2	313
Shale with streaks of limestone (hard)	66	379
Light brown limestone	9	388
Soft gray shale	9	397
Hard brown limestone	254	651
St. Peter sandstone	369	1020
Red shale, water turned red	18	1038
Hard gray shale and hard sandy limestone	195	1233
Sandstone and green shale	80	1313
Galesville sandstone	87	1400
Hard shale	9	1409

A 17.5-in. diameter hole was drilled to a depth of 261 ft, reduced to 13.2 in. between 261 and 402 ft, and finished 10 in. in diameter from 402 to 1409 ft. The well is cased with 14-in. pipe from 3 ft above land surface to a depth of 261 ft and 10-in. pipe from 3 ft above land surface to a depth of 402 ft (cemented in).

A production test was conducted by the driller on August 15-16, 1969. After 24 hr of pumping at rates ranging from 383 to 430 gpm, the final drawdown was 72 ft from a nonpumping water level of 417 ft below land surface.

The pumping equipment presently installed is a Reda submersible pump set at 505 ft, rated at 180 gpm at about 500 ft TDH, and powered by a 40-hp Reda electric motor. The well is equipped with 505 ft of airline.

The following mineral analysis (Lab. No. 195211) is for a water sample from the well collected April 5, 1974.

WELL NO. 1, LABORATORY NO. 195211

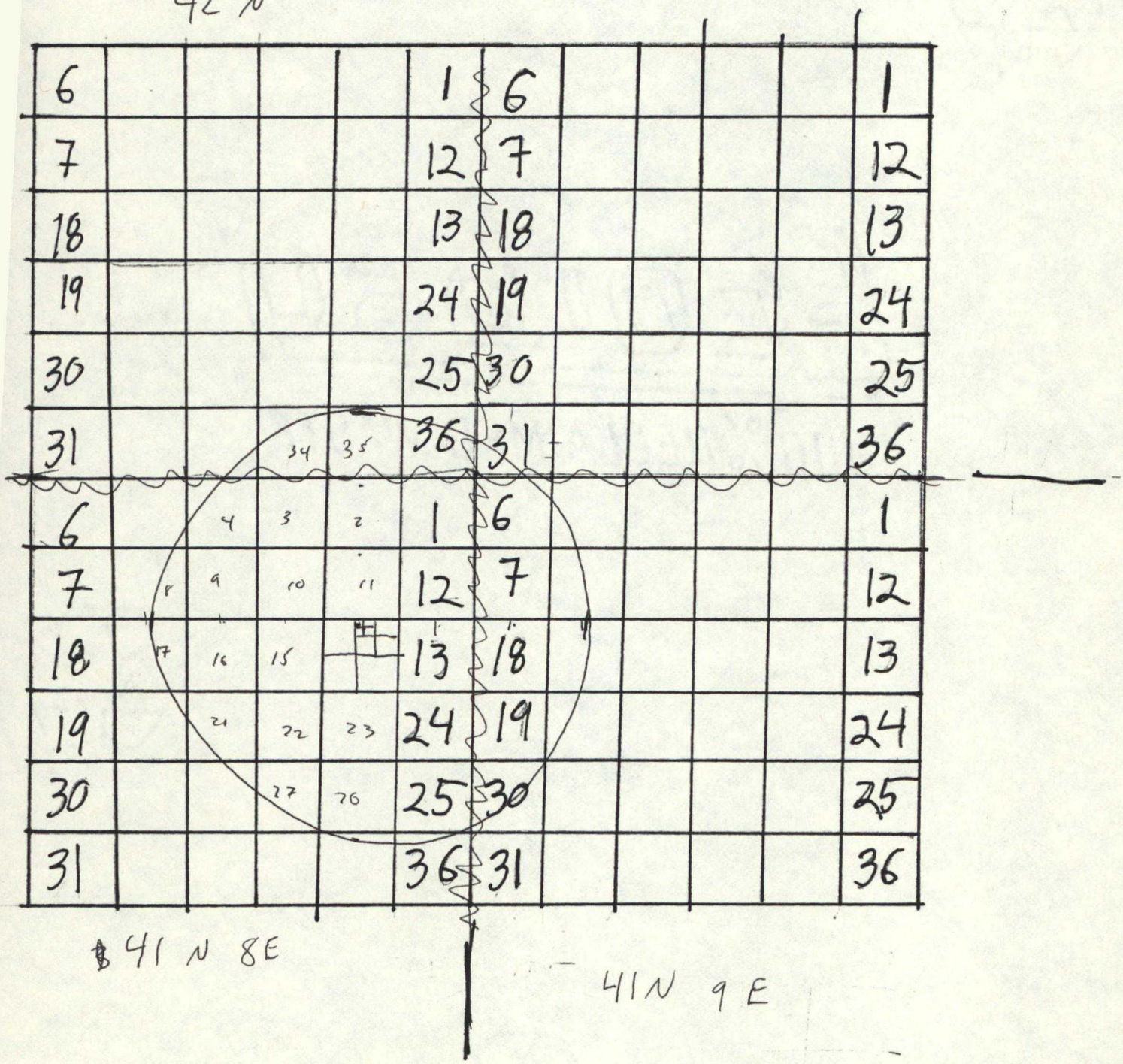
		mg/l	me/l			mg/l	me/l
Iron (total)	Fe	Tr		Silica	SiO_2	6.7	
Manganese	Mn	0.04		Flouride	F	0.8	
Ammonium	NH_4	0.5	0.03	Boron	B	0.3	
Sodium	Na	41.0	1.78	Nitrate	NO_3	0.3	Tr
Potassium	K	10.5	0.27	Chloride	Cl	2	0.06
Calcium	Ca	49.6	2.48	Sulfate	SO_4	5.1	0.11
Magnesium	Mg	21.4	1.76	Alkalinity (as $CaCO_3$)		300	6.00
Strontium	Sr	2.25	0.05				
				Hardness (as $CaCO_3$)		212	4.24
Barium	Ba	<7.8					
Copper	Cu	0.00		Total dissolved			
Cadmium	Cd	0.00		minerals		325	
Chromium	Cr	0.00					
Lead	Pb	<0.05					
Lithium	Li	0.01		Turbidity		0	
Nickel	Ni	<0.05		Color		0	
Zinc	Zn	0.00		Odor		H_2S	

Prior to the construction of Well No. 2, a test well was completed in September 1974 to a depth of 176 ft by the K & K Well Drilling Co., Mokena. The test well was located

Township Grid

Elgin

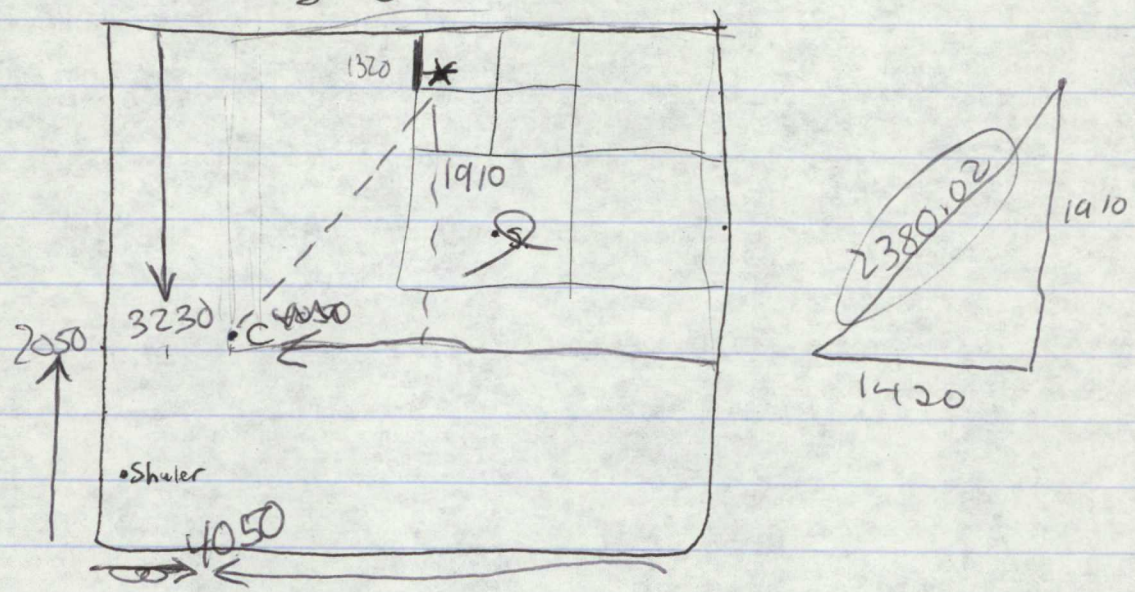
42 N



41 N 8E

41 N 9E

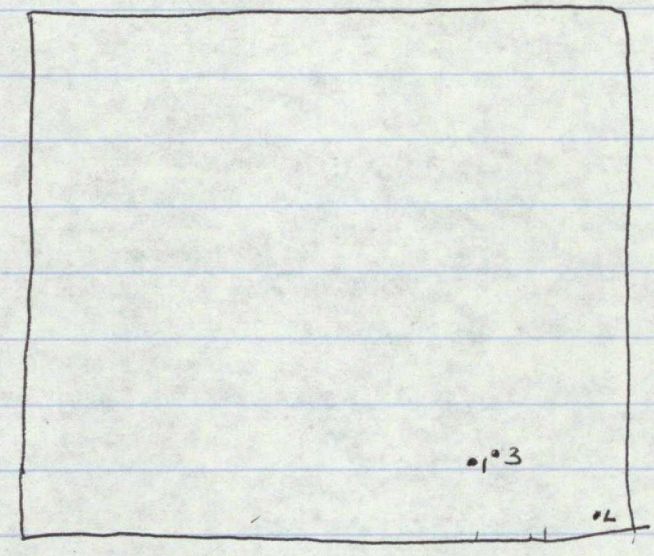
Sec 14!



		Depth	
~~N. State St. Well~~	~~1450 S + 1850 W~~	~~48~~	NIU
Creighton Ave. Well	2050 N 1230 E	795 47' case	
Tamel St.	Not in use	~~55'~~ 106 case	
Shuler St. Well	850 N 250 E	1940	

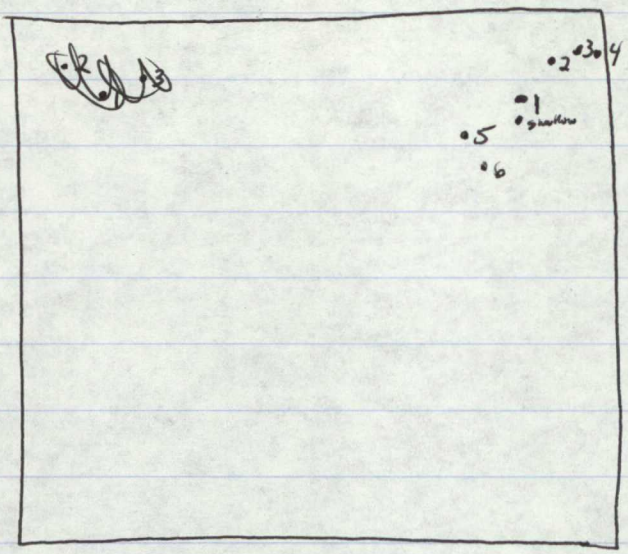
St Charles

Sec 24



Well	Locatn	Depth	watr at
St Charles well #1	700 N 1500 W	101	
Favorite ave	1600 N 270 W	1978	
ST Ch. #2	NOT in use		
" #3	725 N 1525 W	600' cased 1255	

Sect 11



Well	Locatn	Depth	water at
1	= 775 S, 725 W	2000'	240 - 295
2	= 640 S, 575 W	600 cased 1965	328
3	= 600 S, 440 W	1960	
~~4~~	= 525 S, 290 W	1898	265
emergency Shallow well	= 850 S, 700 W	52	
5	= 1175 S, 1175 W	1225	
6	= 1750 S, 1500 W	1300	